END OF YEAR

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REPORT

OF THE

DEPARTMENT of FORESTS and WATERS

COMMONWEALTH OF PENNSYLVANIA

JUNE 1, 1924 to MAY 31, 1926

Forestry Lib
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LETTER OF TRANSMITTAL

Hon. Gifford Pinchot,
Governor of Pennsylvania,
Harrisburg, Pa.

Dear Governor Pinchot:

I have the honor to transmit herewith a report on the work of the Department of Forests and Waters for the two-year period June 1, 1924 to May 31, 1926, and the reports for the same period of the Boards and Commissions affiliated with it, viz: the "State Forest Commission," "Water and Power Resources Board," "State Geographic Board," "Valley Forge Park Commission," "Washington Crossing Park Commission," "The Lake Erie and Ohio River Canal Board," and the "State Park and Harbor Commission of Erie."

This is the second biennial report of the Department of Forests and Waters, created under the reorganization Act of June 7, 1923. This new organization has now been in operation for more than three years. The results show conclusively the wisdom of the administration of the forest, water, and mineral resources of Pennsylvania under one Department. This new plan of organization has already effected a coordination of work and a cooperation in service that assures an efficient and economic handling of the resources entrusted to this Department.

It is also clear that the affiliation of the State Park Commissions with the Department has been effective not only in the supervision of budgetary matters but in close coordination of effort in the improvement and maintenance of the Park properties.

The interest of the public in the development and wise use of our natural resources is increasing markedly. This attitude is reflected in the more generous public support given the work of the Department, and wider participation by private land owners in the restoration of forest and stream. The progress made, as described in the Department reports, is most gratifying and propitious.

Respectfully yours,

R. Y. STUART,
Secretary of Forests and Waters.

October 1, 1926

REPORT OF THE PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS FOR THE YEARS JUNE 1, 1924 TO MAY 31, 1926.

The conservation of the forest, water, and mineral resources of Pennsylvania continues to be one of the most vital problems before her people. Little good can come from the consideration of conservation unless we understand what it means. Conservation means the use of the earth and its natural resources for the greatest good of the greatest number of people for the longest time. The term "natural resources" may be broad enough to include all materials for the use of man on the surface of the earth such as soil and water, those below the surface, such as minerals, and those above the surface of which the forest is the most conspicuous example. These natural resources include the land on which we live and from which we get our food and wood, the living waters which supply human needs, fertilize the soil, sustain fish life, supply power, and form the waterways of commerce, as well as the growing forests with their rich assortment of animal and plant life, and the many minerals which form the basis of our industrial life and provide us with heat, light, and power. All these natural resources are a part of the big conservation movement.

The thing for which conservation stands in Pennsylvania is the making of our State the best place to live in both for this and future generations. Some people have the false notion that conservation means the locking up of resources for the future. There can be no more serious mistake, for the first principle of conservation is wise use. A sound conservation program implies use, but it refuses to recognize wanton waste and needless destruction in the development of natural rsources.

Pennsylvania's material progress would not have been possible without her rich heritage in natural resources which have been drawn upon extensively from the early days to meet man's needs, but in their exploitation have been subjected to abusive and destructive methods. We do not know our forests down to the last cord, nor do we know our water resources down to the last cubic foot, nor our minerals to the last ton, but we know enough about our remaining natural resources to decide that the time is here to use conservative methods in handling them.

There are more than 13,000,000 acres of forest land in Pennsylvania capable of turning out, if properly handled, 10,000,000 cords of wood annually. Our water resources with an annual runoff of almost 2,000,000 million cubic feet are of inestimable worth for domestic and industrial water supplies, water power, and navigation. The remaining mineral resources of Pennsylvania still hold for her the appropriate title "The Industrial Titan" among the states of the Union.

Pennsylvania will continue after we are gone. Others are coming to take our places. They have rights and we must respect them. They will have need for the same kind of natural resources with which we have been blessed so bountifully. We cannot be reproached for the withdrawal of all the wood, water, and minerals we use wisely. We have a right to all that are necessary for our safety, comfort, and happiness, but beyond that we have no right to draw. A wise conservation program aims to provide an equitable distribution of resources between present and future generations. We will act the part of good citizens if we bestow upon our children a wisely conserved heritage of forest, water, and mineral resources. Such a conservation policy will make Pennsylvania a better place in which our boys and girls and their boys and girls can become the kind of men and women we want them to be.

Pennsylvania is now rightly committed to a wise program of forest, water, and mineral conservation, and has delegated powers and duties to the Department of Forests and Waters for the advancement of this work.

The appropriations by the 1925 State Legislature for the work of this Department and related boards and commissions, for the present biennium (June 1, 1925-May 31, 1927) follow:

SALARY OF THE SECRETARY		$16,000.00
THE FOREST SERVICE:		
General forest service expenditures	$1,175,030.00	
Extinction and control of forest fires	200,000.00	
Fixed charges on State Forests and auxiliary forest reserves (school, road, and county taxes)	115,970.00	
Injuries from fighting forest fires	6,000.00	
Repairs to Laurel Dam	10,000.00	1,507,000.00
THE WATER SERVICE:		
Lock Haven Dyke	$3,500.00	
Matamoras Dyke	2,963.77	
Water & Power Resources Board, Engineer	6,000.00	
General expenses of Water Resources Service	125,000.00	
Delaware River Treaty Expenses	15,000.00	
County and Township Tax, Pymatuning Project	5,274.00	157,737.77
TOPOGRAPHIC AND GEOLOGIC SURVEY		135,000.00
STATE PARK BOARDS AND COMMISSIONS:		
Fort Washington Park, interest on mortgages	$5,010.00	
Washington Crossing Park Comsion	120,000.00	
Valley Forge Park Commission	250,000,00	
State Park and Harbor Commission	75,000.00	
Cooperative Harbor work at Erie	25,000.00	
Lake Erie and Ohio River Canal Board	5,000.00	480,010.00
Grand Total		$2,295,747.77

In order that the problems and activities of the Department during the past two years may be properly interpreted and understood, this report is divided into four main parts, namely:

THE FOREST SERVICE

THE WATER SERVICE

THE TOPOGRAPHIC AND GEOLOGIC SURVEY

STATE PARK BOARDS AND COMMISSIONS

THE FOREST SERVICE

During the last two years substantial progress in forestry has been made in Pennsylvania. We now have better forest protection, more extensive tree planting, greater recreational use of the State Forests, and more effective cooperation by the people of the State in all phases of forest work than ever before. To carry on the work of the State Forest Service the 1925 State Legislature made an appropriation of $1,507,000 for the biennium June 1, 1925 to May 31, 1927. In this total were specific appropriations of $200,000 for the extinction and control of forest fires, $115,970 for fixed charges (school, road, and county taxes) on State Forests and auxiliary forest reserves, $6,000 for injuries to persons fighting forest fires, and $10,000 for repairs to Laurel Dam in Cumberland county.

The comparative table that follows shows the trend of appropriations for forestry in Pennsylvania:

Years	*Amount*
1893-1895	$20,000.00
1895-1897	12,820.00
1897-1899	20,019.01
1899-1901	49,072.41
1901-1903	218,249.14
1903-1905	740,724.35
1905-1907	820,730.70
1907-1909	857,500.00
1909-1911	663,500.00
1911-1913	673,500.00
1913-1915	664,438.94
1915-1917	630,750.00
1917-1919	807,000.00
1919-1921	1,071,700.00
1921-1923	1,870,000.00
1923-1925	1,315,000.00
1925-1927	1,523,000.00
	$11,958,004.55

PROGRESS IN FOREST PROTECTION

There is now in effect a comprehensive forest protection plan and a State-wide organization of forest fire fighters comprising 48 foresters, 61 forest rangers, and 3,800 forest fire wardens. The most noteworthy achievement in forest protection is the rapid decrease in the average size of forest fires. This is a good gauge of efficiency in forest fire control. During the three year period (1913-15) the size of the average fire was 339 acres; during the five year period (1916-20) it was 142 acres, while during the last five year period it was only 79 acres. During 1924, 1,947 forest fires were reported and extinguished in the State. The average area of these fires was only 48 acres. In 1925, there were 2,562 fires with an average area of 48.5 acres. During these two years the area of the average fire was less than in any year since the Department has kept records. The estimated forest fire damage in 1924 was $204,296.60, and in 1925, $760,715.28, making a total of $965,011.88 during the last two years.

The fire season during the spring of 1926 was unusually long and as severe as any fire season experienced by the Department. The fires were hard to extinguish and very difficult to keep under control. From the middle of April to the middle of May there was a severe drought accompanied with high and dry winds over the

entire State. In some forest districts 30 days elapsed with less than one-tenth of an inch of rainfall. In spite of these unfavorable conditions the size of the average fire was kept down to 81.5 acres. There have been only two spring fire seasons—1924 and 1925—with a lower average.

The forest fires of Pennsylvania by periods from 1913 to 1925 follow:

Years	*Average Annual Area Burned (acres)*	*Average Annual Number of Fires*	*Average Area Per Fire (acres)*
1913-15	362,408	1,070	339
1916-20	207,934	1,458	142
1921-25	223,508	2,828	79

Never in the history of the Department did the people respond more fully to the forest fire situation than in the spring of 1926. Special forest protection organizations in all parts of the State are giving hearty and helpful cooperation. In a number of cases District Foresters could not use advantageously all the people who volunteered to fight the fires. It is becoming obvious that the public conscience is aroused to the menace of forest fires.

During the last four years the forest fire detection and extinction forces have been greatly strengthened. Observation towers have been increased and the telephone lines extended. There are now 115 forest observation towers in use. The inspection and removal of fire hazards has been given special attention, and those responsible for forest fires have been charged fully with their responsibility. With the concurrence of the Attorney General, legal assistance has been secured in making a careful study of the forest fire laws of the State and in conducting prosecutions. As a result, there have been more prosecutions and more convictions, and there is developing a better public understanding of the consequences of forest fires.

The progress of forest protection in Pennsylvania means that a material advance has been made in forest restoration. As a result of this effective protection work the timber production ledger of Pennsylvania is changing from heavy and unnecessary losses to substantial and growing gains. For the first time in many years the wood grown in the forests of Pennsylvania is greater than destroyed by fire. This means that Pennsylvania is gradually regaining her place as a great timber producing state.

FOREST LAND PURCHASE PROGRAM

No appropriation for the purchase of forest land has been made by the last three legislatures. The last appropriation was made in 1919, when $130,000 were appropriated for the purchase of forest

land and $6,000 for forest land surveys. Through the lack of appropriation the land purchase program has dwindled to an almost negligible figure. During the last few years the State came into possession of small areas of forest land through deferred acquisition due to questions in title, and by special gifts. The acreage acquired by years follows:

Year	*Area Acquired*	
	Acres	*Perches*
1923	766	46
1924	334	61
1925	172	43
Total	1,272	150

The total area of forest land owned by the State on May 31, 1926 was 1,131,783 acres, 62 perches. This land was acquired at a total purchase price of $2,560,298.25, an average of $2.26 per acre. The present purchase program calls for a bond issue of $25,000,000 for the purchase of forest land by the State.

THE FOREST BOND ISSUE

The most progressive step in Pennsylvania forestry during the last four years is the advance given the proposed bond issue of $25,000,000 for the purchase by the State of approximately 3,500,000 acres of idle forest land. A resolution to amend the State constitution, so that the forest bond issue may be authorized, passed the 1923 and 1925 sessions of the legislature. This proposal is now ready to be submitted to the people. The Supreme Court decided, however, that a vote of the people on this and other proposed amendments to the constitution could not be taken until the November, 1928, election.

While the vote on the Bond Issue must be delayed for two more years, the people of the State are maintaining interest in this important issue, which is so urgently needed to safeguard the wood needs and the general welfare of the State. This comprehensive plan of forest land acquisition is also necessary to secure adequate water supplies and opportunities for public recreation and public health. The best way to insure adequate timber supplies, public play grounds, hunting and fishing grounds, and health centers for all our people and to protect our water supplies is to maintain large areas of publicly owned forest land in all parts of the State. Future citizens need the protection and privileges afforded by State-owned forest land—a heritage that is justly theirs. The State-owned lands are managed to bring the greatest measure of good to the greatest number of people. With 27 years of experience in forest land acquisition and management, Pennsylvania is well prepared to go forward with a sound and practical purchase program of enlarging her forest holdings.

STATE FOREST RECEIPTS

The State of Pennsylvania began purchasing forest land in 1898. When the land was acquired there was little tree growth upon most of it. In spite of the deplorable conditions that existed on the State Forests at the time the land was acquired, a considerable income has already been received from it.

The first receipts from the State Forests, amounting to $1,227.87 were obtained in 1900. The revenue was made up from the sale of lumber, poles, fuel wood, minerals, and from rentals, leases, and other privileges on the State Forests. The rate at which the income has increased is shown in the following two tables, which set forth the income during the first four and the last four years of State ownership:

FIRST FOUR YEARS OF INCOME FROM STATE FORESTS (1900-1903)

Year	*Amount*
1900	$1,227.87
1901	1,951.57
1902	1,578.70
1903	9,758.02
Total	$14,516.16

LAST FOUR YEARS OF INCOME FROM STATE FORESTS (1922-1925)

Year	*Amount*
1922	$45,311.57
1923	80,275.90
1924	88,199.56
1925	68,607.28
Total	$282,394.31

The foregoing tables show that during the first four years of State Forest ownership, only $14.516.16 were derived from the sale of forest products, while during the last four years a total of $282,-394.31 were derived. The income during the last four years is almost equal to the total income during the first 22 years (1900-1921) of State Forest ownership.

The total receipts from the State Forests up to January 1, 1926 totaled $587,930.95, of which $344.464.50 have been deposited in the State School fund. The moneys deposited in the State School Fund to date are listed in the following table:

Year	*Amount*
Prior to 1920	$190,889.48
" " 1920	32,225.37
" " 1921	18,272.10
" " 1922	26,985.39
" " 1923	24,324.41
" " 1924	25,359.06
" " 1925	26,408.69
Total to January 1, 1926	$344,464.50

The foregoing table shows that the receipts from the State Forests are gradually building up the State School Fund. As the forests become mature and cuttting operations become more extensive, the income will be increased considerably. Before many years the School Fund will be built up to such an extent that the forests will be a big factor in maintaining the schools of the State.

Between January 1, 1926 and May 31, 1926, a total of $8,813.94 was deposited in the State School Fund. The main items were camp leases $3,153.10, wood on the stump $2,399.50, and minerals $2,104.59.

STATE FOREST IMPROVEMENTS

During the last two years 32 new buildings have been erected on the State Forests at a total cost of $42,697.73. Among these buildings are 5 dwellings, 7 shops and sheds, and 4 barns. In this period more than 90 miles of roads and about 100 miles of trails were opened. The Department now maintains 1,318 miles of road and 2,544 miles of trails. At the last session of the legislature the State Department of Highways was authorized to spend $100,000 annually in the construction and maintenance of roads within the State Forests. There are now in operation 115 forest fire towers constructed at a total cost of about $115,000. These permanent improvements insure better handling of the forests and make them available to a wider public use.

Of even greater significance than these permanent improvements is the obvious improvement in the condition of the forests in all parts of the State. The State's program of forest restoration has brought about a great change. In many places where formerly occurred vast stretches of barren land there are now found promising stands of thrifty trees. The 1,131,783 acres of State Forests, purchased by the State at an average price of $2.26 per acre, represent a total net gain to the State of more than $5,000,000 since their acquisition. This State-owned forest land is handled as a business enterprise and with continuous management it will yield increasingly higher returns.

RECREATION ON THE STATE FORESTS

More people now use the State Forests for rest and recreation than ever before. Records show that in 1925 approximately 850,000 people were guests on the State Forests. Among these were 32,000 fishermen and 185,000 hunters. Not less than 130,000 people enjoyed themselves in the State Forest Parks, and more than 60,000 visited the 115 forest observation towers that now dot the entire State.

To meet this great public need, special areas have been set aside for recreational use. There are now within the State Forests 7 State Forest Parks, 9 State Forest Monuments, 3 Special Scenic Areas, and 36 Public Camping Grounds. The use of all these recreational areas is free to the public. They are the people's playground.

There are now more than 1,500 permanent camp sites on the State Forests of Pennsylvania. During 1925 about 80,000 people enjoyed the shade, shelter, and comforts of these outdoor homes. These camp sites are leased at the nominal rental of $7.00 to $15.00 per year. During 1925 the income to the State from these camp site leases was $12,611.25.

Legitimate hunting and fishing is encouraged on the State-owned forest land of Pennsylvania. Many hunters select the State Forests as their best hunting ground, and within them one finds some of the finest fishing streams. During 1924, 4,055 deer and 412 bear, and in 1925, 5,091 deer and 185 bear were killed on the State Forests of Pennsylvania. Reliable records show that 58 per cent of the deer and 42 per cent of the bear killed in the entire State came from the State Forests. It cannot be denied that the State Forests are the favored hunting grounds of the Pennsylvania sportsman. Without good forests there can be no game or fish worthy of the sportsman's skill.

Large Boy Scout and Girl Scout camps are located on the State Forests. Here the boys and girls study tree life and take lessons in forest conservation. Apart from the practical value, these tree environments make for better manhood and womanhood by inspiring higher thoughts and cleaner ideas about life.

There are now 36 Public Camps on the State Forests of Pennsylvania. Twenty-five of these have been erected during the last four years and ten during the period of this report. More than 125,000 people enjoyed themselves at these outdoor play places during 1925. These camps are equipped with shelters, tables, and other simple camping facilities. Adequate supplies of fresh water are found at or near them. They are available to all who wish to go in the out of doors and enjoy nature. Better health and greater happiness await all who visit them. The State Forests of Pennsylvania pay big health dividends to all who visit these beauty spots and enjoy the camping facilities available for everybody.

FOREST TREE PLANTING ON THE STATE FORESTS

During the last four years almost two million trees have been planted on the State Forests. Since 1899 when tree planting started on the State Forests, a total of 36,257,009 trees have been set out on State-owned forest land. The number of trees planted on the State Forests and the area reforested during the last four years is given in the following table:

Year	*Number of Trees Planted*	*Area (acres)*	*Cost*
1923	551,462	429.96	$1,133.34
1924	424,380	306.27	4,878.31
1925	362,100	290.65	3,721.71
1926 (spring)	560,525	427.23	4,815.59

The State Forest plantations are doing more than merely producing wood. They are object lessons in practical forestry. They show what may be expected if forest trees are planted. Some of the trees in the State Forest plantations have already reached a height of 45 feet and a diameter at breast-high of 10 inches. These plantations show what may be done to make idle land productive.

The demand for planting stock by private owners has been so great that the planting on the State Forests, relatively less urgent, has been somewhat curtailed so as to make possible the immediate reforestation of the many acres of privately-owned forest land that were absolutely unproductive and an economic menace.

The plantations on the State Forests have shown many private owners of forest land how to handle their unproductive land. In the State plantations have been established demonstration areas which are used primarily to show the way to practice good forestry on many thousand acres of unproductive land in Pennsylvania. Many special study plots have also been established in the State plantations from which is collected valuable information about the growth and yield of our forest trees. The State plantations have been a big factor in promoting reforestation and are yielding valuable information that is urgently needed in developing efficient methods of handling the forests of the State.

TREE PLANTING BY PRIVATE OWNERS OF FOREST LAND

Pennsylvania is one of the leading forest tree planting states. In 1910 the State began distributing forest tree planting stock grown in the State Nurseries to private land owners **at the cost of production.** In 1915 a new plan of tree distribution was inaugurated.

Under this new plan forest tree planting stock is made available to private owners of forest land located within the State **at the cost of boxing and shipping.** This is the most generous forest tree planting plan offered on a large scale by any state and it has been a big factor in promoting the reforestation of idle land.

During the 17 years the Department has cooperated in this tree planting program, more than 50,000,000 trees have been shipped from the State Nurseries to reforest land within the State. Year by year the land owners of the State are becoming better acquainted with the merits of forest tree planting, and as a result the reforestation of idle acres is moving forward by leaps and bounds. A comparison of the results of this tree planting program during the first five years after its inauguration and during the last five years is shown in the following table:

FIRST FIVE YEARS
1910-1914

Year	*Number of Planters*	*Number of Trees Planted*
1910	23	66,374
1911	24	25,360
1912	20	66,854
1913	25	47,770
1914	42	108,685
	Total	315,043

LAST FIVE YEARS
1922-1926

Year	*Number of Planters*	*Number of Trees Planted*
1922	1,323	3,670,621
1923	1,572	5,437,817
1924	2,081	8,577,464
1925	2,156	8,604,091
1926 (spring) .	2,403	9,167,916
	Total	35,457,909

These two tables show the enormous increase of private forest tree planting in Pennsylvania. During the first five years the annual planting averaged only about 63,000 trees, while it has now almost reached the 10,000,000 mark. More than 100 times as many trees were planted during the last five years as in the first five years, 1910-14. In 1925, 75 times as many trees were planted as

in 1915, just ten years earlier. At no time since the World War have the State Nurseries been able to meet the demand of private land owners for tree planting stock. About 20 million trees will be available in the nurseries of this Department for planting in the spring of 1927. This is more than twice as many as have been available in any previous planting season. The rate at which forest tree planting has increased is one of the most gratifying features of the forestry movement. It shows that the people of Pennsylvania are attempting to solve the idle land problem and beginning to appreciate the merits of reforestation.

ROADSIDE TREE PLANTING

During the last five years special efforts have been made to make the roadways of Pennsylvania more beautiful. In this work the Department of Forests and Waters and the State Highway Department have cooperated. Under this cooperative arrangement there have been planted along the highways of the State 17,070 trees at a total cost of $25,909.62, an average of $1.52 per tree.

KIND OF TREES.

Year	Oriental Plane	Norway Spruce	Other	Total Cost	Cost Per Tree
1921	5,319		165	$7,588.71	$1.33
1922	5,291			7,037.87	1.33
1923	1,387	654		2,759.14	1.35
1924	3,729	25		7,883.90	2.09
1925					
1926 (spring)	500			640.00	1.28
1926 (spring)	16,226	679	165	$25,909.62	$1.52

Of the 17,070 trees planted, 5,946 were used for replacements. In 1923, 1924 and 1926, 1,692, 3,754 and 500 trees respectively were used to replace trees that had not succeeded in the original plantings of 1921 and 1922.

The trees were, in most cases, planted on both sides of the highway, except where obstructions prevented, in which cases the trees were planted only on one side of the highway. These planted trees, spaced 60 feet apart, add greatly to the attractiveness of about 75 miles of Penn's Highways.

FOREST TREE NURSERIES

Three large and two small forest tree nurseries are operated on the State Forests by the Department of Forests and Waters, and eight additional nurseries are operated cooperatively by this Department and State institutions. In addition to these, a large central forest tree nursery, covering 100 acres, was established in 1925. The nurseries on the State Forests cover 30 acres, with an annual

capacity of almost 8,000,000 trees. The cooperative nurseries at State Institutions cover 20.5 acres and have an annual capacity of 3,000,000 trees. The cooperative nurseries are located at the Allentown State Hospital at Allentown, Danville State Hospital at Danville, Harrisburg State Hospital at Harrisburg, Torrance State Hospital in Westmoreland county, Wernersville State Hospital at Wernersville, the Pennsylvania Industrial Reformatory at Huntingdon, the Polk State School at Polk, and the Western Penitentiary at Rockview. The nurseries at the Industrial Reformatory at Huntingdon and the Western Penitentiary at Rockview are the larger of the cooperative nurseries. The former has an annual capacity of 1,000,000 trees and the latter 2,000,000 trees. The nursery activities at these institutions afford healthful and constructive outdoor work for those most in need of it.

In order to supply the rapidly growing demands for forest tree planting stock, a large central nursery was established in the fall of 1925. It is located along the Susquehanna Trail, in Northumberland county, five miles south of Milton. The area of this nursery is a hundred acres. In the fall of 1925, 220 bushels of walnuts and 46 bushels of red oak acorns were planted in this nursery. Early in the spring of 1926 nursery operations were started on a large scale. By June 1, 1926, 993 pounds of white pine, red pine, Scotch pine, Norway spruce, and Japanese larch seeds had been planted. There were also set out in this nursery 440,000 small trees for special transplant stock. In addition, more than 31,000 trees were transplanted in the nursery to be used later as special ornamental planting stock on the public grounds at State institutions. In this nursery almost 8 acres of land have already been put to the growing of forest trees from seed, and about 10 acres to the growing of transplants. This is now the largest forest tree nursery operated by the Department, and when its capacity is attained an ample supply of forest tree planting stock will be available to meet the reforestation needs in all parts of the State.

DEMONSTRATION AREAS

The current trend in forestry is toward practical demonstration. Forest land owners are willing to do more work in their forests, but they want to know how to do it and be sure their work is done right. The average forest land owner may be willing to read a little about forestry and to be told a few things about forestry, but what he wants is to be shown forestry in a practical way. To meet this urgent need there have been established special demonstration areas in all parts of the State covering many phases of forest work

The first demonstration area was established in the Mont Alto State Forest in Franklin county in 1903. Since then 50 additional

areas have been set aside for demonstration purposes, both on the State Forests and on privately owned land. Twenty-five of these were established during the last two years. These demonstration areas have been developed on a wide range of forest conditions and cover many different phases of forest operations. They cover the entire field of forest tree planting, show the results of forest protection, illustrate different methods of forest improvement work, proper thinning methods, and other lines of forest work.

As a rule, each of these areas is laid out to show some special phase of forest work. The information gathered on these special areas is of great value in determining forestry methods which are silviculturally feasible and economically recommendable. These demonstration areas are more than mere show places. They are important study places, for they yield valuable technical information about growth and yield of our forests, and give the cost of different forest operations. Present plans call for a rapid extension of this important line of work. Not less than 25 new plots will be established during the next year.

SPECIAL RESEARCH STUDIES

To handle the forest problems of Pennsylvania properly requires continuous study. There are now in progress under the direction of the research workers of this Department more than 50 special study projects covering practically all phases of forestry work. Among the principal research projects are:

1. THE FOREST SITUATION OF PENNSYLVANIA. This is a progressive study of the forest area, forest growth, forest yield, wood production and wood consumption of the State. A bulletin has been published on this subject. A new edition of it is now in preparation.

2. FOREST TYPES OF PENNSYLVANIA. This study gives special attention to the composition of our forests by listing the principal forest types within the State with their chief indicator species, also their distribution and their major physical peculiarities.

3. THE BIRCH, BEECH AND MAPLE TYPE IN PENNSYLVANIA. This project comprises a study of the occurence of this important forest type, which is widely distributed in northern Pennsylvania. Special consideration is given to its composition, growth, yield, best method of handling it, and the effects of forest fires on its development.

4. SPECIAL TREE STUDIES. Among the 110 trees native to Pennsylvania are a number that are of special importance. To collect information about them special tree studies have been undertaken. The most important of these studies now in progress are:

1. Red Pine in Pennsylvania
2. Pitch Pine in Pennsylvania
3. Black Locust in Pennsylvania
4. Chestnut Oak in Pennsylvania

During the last two years two special tree studies have been completed. They are "The Ailanthus Tree in Pennsylvania" and "The Cottonwood in Pennsylvania". The report on the former has been published as Bulletin 38 of this Department.

5. FOREST FIRE STUDIES. Forest fires continue to be the greatest enemy of the woodlands of Pennsylvania. To help handle the fire situation the following studies are in progress:

1. Forest Fire Hazard Survey
2. Forest Fire Fighting Equipment and Technique
3. Assessment of Forest Fire Damage
4. The Slash Disposal Problem
5. Huckleberry Production with and without Forest Fires.

6. REFORESTATION STUDIES. How to put the idle forest land of Pennsylvania to work and keep it at work producing wood and other human benefits is one of the big and vital problems of the day. In order to help promote this important line of work the following study projects have been undertaken:

1. Source of Forest Tree Seed
2. Nursery Fertilizer Experiments
3. Sterilization of Nursery Beds
4. Winter Storage of Nursery Stock
5. Direct Seeding Experiments
6. Age of Planting Stock
7. Seedlings versus Transplants
8. Fall versus Spring Planting
9. Forest Tree Planting Methods and Technique
10. Spacing of Seedlings and Transplants
11. Introduction of Foreign Trees
12. Forest Conversion Studies
13. Liberation Cutting Experiments
14. Results of Private Forest Tree Planting

7. GROWTH AND YIELD STUDIES. There is urgent need for more and better information about the growth and yield of the

important forest trees of Pennsylvania. To assist in the collection of this information more than 50 sample plots have been established, 35 of which are on the State forests. Among the major growth and yield studies now in progress are:

1. Growth and Behavior of White Pine in Pennsylvania
2. Growth and Behavior of Scotch Pine in Pennsylvania
3. Growth and Behavior of Norway Spruce in Pennsylvania
4. Growth and Behavior of European Larch in Pennsylvania
5. Growth and Behavior of White Oak in Pennsylvania
6. Sub-soil Dynamiting for Growth Acceleration
7. Experimental Thinning and Pruning.

8. WOOD INDUSTRY STUDIES. Special studies are in progress covering three of the major wood-using industries. They are:

1. The Hardwood Distillation Industry in Pennsylvania
2. The Pulpwood Industry in Pennsylvania
3. The Tanning Industry in Pennsylvania

A full list of the major forest studies of this Department including those of the State Forest School at Mont Alto, has been prepared for the Allegheny Section of the Society of American Foresters. It will be published shortly, and should be very helpful in promoting the practice of forestry in Pennsylvania.

PUBLIC COOPERATION AND EDUCATION

This Department is continuing its cooperation with private forest land owners by making examinations of forest land in all parts of the state and giving recommendations for its proper handling. For farm woodlots and other small forest properties these reports are prepared free of charge. Examinations of larger properties are made and reports prepared thereon, but the owner pays the actual cost incurred in making examinations. During 1924, 624 tracts, and in 1925, 463 tracts were examined. These 1,086 tracts aggregate 138,510 acres. Since 1920, when these examinations were started on a large scale, 1,939 tracts have been examined aggregating 386,749 acres.

The entire forestry personal of this Department continually stresses the need for sound forest practice through extension work, general and special demonstrations, personal conferences, public talks, moving pictures, and by special contributions to the press and periodicals. Information on all phases of forest work is made available to the forestry profession and the public. Important forestry topics are placed before the public in signs and posters. In the last two years more than 150,000 posters and placards have been

distributed in all parts of the State. A special travelling exhibit visualizing the more important phases of forest work was shown at many fairs and other public gatherings. The most elaborate exhibit placed this year is in the Pennsylvania Building at the Sesqui-Centennial in Philadelphia. It depicts the story of Penn's Woods in three epochs, namely, (1) The Primeval (Original) Forest; (2) Forest Devastation; and (3) Forest Restoration.

During the two year period covered by this report the State Forest Service distributed more than 400,000 copies of bulletins and circulars covering many phases of forest work. Among the principal new publications are: "The State Forests of Pennsylvania," "In Penn's Woods," "Lessons in Forest Protection," "How to Prevent Forest Fires," "The Ailanthus Tree in Pennsylvania," "How to Use the State Forests," "Why Pennsylvania Needs more State Forests," "What Forest Protection Has Accomplished," "Plant Forest Trees on Idle Acres," "Forest Tree Planting Recommendations," and "Forest Trees to Plant." Most of these new publications were issued in editions of 5,000 to 10,000 copies each, but the demand for the illustrated handbooks on "The State Forests of Pennsylvania" and "In Penn's Woods" was so great that an edition of 100,000 copies of the former and 50,000 copies of the latter were required. All these bulletins are attractive in their make-up, written in simple style, and most of them are well illustrated. Because of these qualities they are in great demand in the public schools and in general educational work. During this biennium the fourth edition (10,000 copies) of "Pennsylvania Trees" was issued and distributed, and an order was placed for the fifth edition of 20,000 copies. Revised and enlarged editions of "Guide to Forestry" and "Talks on Forestry" were also issued.

A new forest map (5 x 9 feet) showing the location of the larger forest areas of the State was completed in 1925. This map shows that 47 per cent of the total land area of the State is in forests, which make up a total of 13,206,000 acres. The demand for Public Use Maps and for the State Forest Map showed a marked increase during this biennium, when more than 25,000 copies were distributed.

In January, 1926, the first number of "The Forest Warden News" was issued. It is the official organ of the forest fire wardens of Pennsylvania, whose number increased from 3,200 to 3,800 during the period of this report. The forest fire wardens already show great interest in their new publication and it promises to do much good among these faithful watchers over Penn's Woods. The circulation of the Department's mimeographed weekly "Service Let-

ter" almost doubled during the last two years. It is now distributed to more than 400 persons and organizations interested in the current work of the Department. Another important channel of helpful educational service is the growing army of Forest Guides of Pennsylvania. This organization now numbers more than 25,000 Pennsylvania boys who have signed a pledge to help protect the forests of Pennsylvania and to urge others to help in this important conservation work.

STATE FOREST SCHOOL

The State Forest School of Pennsylvania, with an enrollment of 79 students, now has the largest attendance since it establishment in 1903. The principal improvement during the last two years was the erection of a large school building. It was projected in the budget of 1924 and provided for in the appropriation of 1926. It is a 3-story brick building 153 x 69 feet and fire proof throughout. The construction work was started late in 1925 and is to be completed for occupancy by January, 1927. When this building with its laboratories, class rooms, library, chapel, museum, and other necessary appointments is completed, there will be accomodations at the school for 100 students. The revised curriculum, the increased faculty, the enlarged buildings, and the improved equipment now available at the school make possible unsurpassed educational facilities for practical instruction in forestry.

Another important feature introduced into the school program is an annual study tour through the forests of central Europe. Three tours have already been completed with great success. These school journeys to the great forests of continental Europe, in many of which forestry has been practiced for more than 100 years, are very helpful to the students in interpreting their forestry lessons and fashioning goals for a sound forestry program. These trips are taken in charge of a regular instructor in forestry. Dr. C. A. Schenck, former director of the Biltmore Forest School, serves regularly as a special guide in forestry. It is planned to make these trips a regular feature of the school program.

The recent enlargement and revision of the school program is already showing good results. By adding a fourth year to the course of instruction and by increasing the faculty, the State Forest School was recognized by the College and University Council of the State and authorized to grant the degree of Bachelor of Science in Forestry.

During the two school years 1924-25 and 1925-26, 34 men were graduated from the State Forest School. Records show that 30 per

cent of these graduates are now in the service of the State of Pennsylvania, 17 per cent are in the U. S. Forest Service, 15 per cent in other State service, while the others are employed elsewhere or are taking advanced work in forestry.

THE WATER SERVICE

Prior to June 15, 1923, the Water Supply Commission of Pennsylvania had control over the water of the Commonwealth, except their purity, which was and continues to be a function of the State Department of Health and of the State Sanitary Water Board. The "Administrative Code" reorganized the Water Supply Commission under the name of "Water and Power Resources Board," and made it an administrative body in the Department of Forests and Waters. The powers and duties of the Water Supply Commission are now divided between the Water and Power Resources Board and the Water Resources Service within the Department of Forests and Waters. The duties of the Water Resources Service are chiefly regulatory and investigatory in character, while the Water and Power Resources Board acts upon all applications for water power and water company charters, limited power and water supply permits, and permits for dams and other water obstructions. The complete report of the Water and Power Resources Board is appended to this report.

EXAMINATION OF DAMS

The Water Resources Service has made investigations and prepared reports in connection with all applications presented to the Water and Power Resources Board. It has examined dams during construction to see that the plans and specifications are being carried out, examined existing dams to determine their safety, and has investigated complaints with respect to water conditions in all parts of the state. One hundred applications were received during the biennium for the construction of new dams and 41 applications for repairs or alterations of existing dams. One hundred and eighteen permits were issued, 74 for new dams, 34 for repairs or alterations to existing dams, and 10 miscellaneous permits. The most important dams for which permits were issued are the Still Creek Dam of the Panther Valley Water Company, and the Pickering Creek Dam of the Philadelphia Suburban Water Company.

Six hundred and eighty-one applications for encroachments other than dams were received during the period of this report. Four hundred and thirty permits were issued for the construction of bridges, 9 for fills, and 179 for miscellaneous encroachments—a total of 618 permits.

ESTABLISHMENT OF CHANNEL LINES

During the past year channel lines have been established along the Schuylkill River at Manayunk between the Flat Rock Dam and the mouth of the Wissahickon Creek—a distance of three miles. These adopted lines define the channel beyond which no encroachments will be permitted. These lines are defined by courses and distances and will be marked on the ground by a series of 90 monuments and bronze markers. Through co-operation with the city of York, channel lines were established along Codorus creek within the city limits for a distance of 2.2 miles. Surveys and engineering studies are being made and plans prepared for the establishment of channel lines along the Shenango River in the cities of New Castle and Sharon.

THE PYMATUNING AND WALLENPAUPACK PROJECTS

Work on the Pymatuning Reservoir Project during the past two years consisted largely in the administration of the land acquired by the State, the sale of some of the timber thereon, the maintenance and operation of stream gaging stations, and the purchase of additional land with the accumulated funds from rentals. Further details of this project are given in the Board's report to the Governor.

The Wallenpaupack Hydro-Electric Project, described in the last biennial report and built under a permit issued January 16, 1924, is now practically completed and in operation. A Department engineer was on this project from August 1, 1924 to December 15, 1925. Lake Wallenpaupack, the storage reservoir of this project, is the largest body of water in the State. When full it covers 5,760 acres and holds 70,500,000,000 gallons of water. A more complete statement on this project is included in the Board's report to the Governor.

STREAM GAGING, FLOOD WARNING, AND PRECIPITATION

There were 70 stream gaging stations in operation in Pennsylvania at the beginning of the period of this report. Ten new stations were established and one discontinued, leaving 79 stations in operation on May 31, 1926. Plans and specifications are being prepared for the construction of wells and shelter houses for the installation of automatic stage recorders at Harrisburg, Wilkes-Barre, Grater's Ford, and Sharon stations. The proposed stage recording equipment for Harrisburg and Wilkes-Barre are novel in their design. At Harrisburg a chamber for the gage will be provided in one of the east plaza columns of the New Market Street bridge, with a well constructed in the abutment. At Wilkes-Barre the well

will be located in one of the piers of the new Market Street bridge with a bronze kiosk shelter for the gage at the side of the bridge footwalk. The flood warning service was continued for the Susquehanna basin. During the period of this report there were four floods of sufficient magnitude to require warnings. Through the co-operation of District Foresters of this Department, the number of precipitation stations has been increased from 24 to 37. The new stations are located in Bedford and Westmoreland counties. The hydrographic data for the water years October 1, 1923 to September 30, 1925, will be published in separate reports.

THE CULM SITUATION

During the period covered by the last Department report, January 1, 1922 to May 31, 1924, a study of the culm situation and other mine refuse problems in the anthracite region, was begun. During the last two years this work was continued and enlarged to include the entire anthracite field. This study is being promoted to determine the location of stream channels that have become obstructed with silt and culm; also the sources from which silt enters stream channels, the amount thereof, damage caused thereby, and methods employed for its removal from the waste water and its disposal. This work is being conducted in co-operation with the Topographic and Geologic Survey of this Department and the U. S. Bureau of Mines. It includes the sampling and analysis of silt banks and deposits in stream channels and a study of methods used in the preparation of coal for the market and the recovery of fine sizes. During the progress of this study numerous conferences were arranged with coal operators and the Department hopes to secure the cooperation of many of them in planning for improved methods of culm disposal and the excavation of stream channels where conditions are particularly serious. A number of coal collieries have already adopted improved methods. With the development of this study less culm will find its way into the streams, and as a result better stream channels will be maintained.

FLOOD PROBLEMS

The city of Lock Haven, located chiefly on flat ground between Bald Eagle Creek and the West Branch of the Susquehanna, has suffered severely from floods for many years. The first flood of record that did considerable damage occurred in 1847. Since then there have been four big floods, the most destructive occurring in June, 1889. Three of these floods were due to excessive precipitation, but the last flood, that of 1918, was due to an ice jam in the river between Lock Haven and Williamsport. Since 1918 the city

has been periodically threatened by inundation due to ice conditions in the river. Within the last year there was a partial overflow over the lower portion of the city. An appropriation of $3,500 was made under the act of May 12, 1925 for the purpose of making a survey and preparing plans and specifications that will relieve this dangerous flood situation. The survey has been completed, and plans and estimates have been prepared of the cost of the work that should protect the city from future flood damage.

The Department has also supervised repairs in the Matamoras Dike along the Delaware River at Matamoras, Pike county. By the Act of May 14, 1925, $3,000 was appropriated for this work. The work has been completed at a cost of $2,640.09 under a contract let August, 1925.

THE LAUREL DAM PROJECT

An Act of May 6, 1925 appropriated $10,000 for the purpose of repairing and dredging Laurel Dam in the Michaux State Forest, Cumberland county. The reservoir of this dam covers about 20 acres and is the largest body of water in the South Mountains. The dam was built many years ago in connection with Laurel Forge. It was mainly of wood construction and the greater portion of the dam had deteriorated to such an extent that it was feared the dam would fail. As a safeguard against probable flood damage and also to improve the recreational facilities in the South Mountains, a specific appropriation was made for repairing and dredging this dam. Surveys were made and plans and specifications prepared by engineers of the Water Resources Service. The contract was awarded and the work was completed in the fall of 1925 at a cost of $8,842.10. The improved dam is a big asset in the development of the recreational resources in this popular and growing forest community in the South Mountains.

TOPOGRAPHIC AND GEOLOGIC SURVEY

The Topographic and Geologic Survey of Pennsylvania was organized to make a "thorough and extended survey" and to determine and broadcast knowledge of the "geology and topography of the State," of its "ores, coals, oils, clays, soils, fertilizing and other useful minerals, and of waters." The Survey is the eyes of the mining industry. The mining industry of Pennsylvania is the fundamental reason why this State, thirty-second in size, is second in population, industry, and wealth. Pennsylvania in 1923 mined 23.6 per cent of all the minerals mined in the United States.

While the Geological Survey, established in 1836, cannot claim the credit for the great development, it certainly has helped in no small measure to bring it about. The magnitude of mining and metallurgy in Pennsylvania is expressed at the Sesqui-Centennial at Philadelphia by a gold obelisk containing 46 cubic feet, and representing a value in gold of $16,683,000, equivalent to the value of two days' production of the mines and smelters.

SPECIAL PROJECTS AND REPORTS

June 1, 1924 the Survey was engaged on 28 geologic projects; June 1, 1926, 9 of these had been completed and reports either were published or in press; 2 others were completed, to be published by the U. S. Geological Survey; 10 more were nearly completed. Eleven new geologic projects were started, of which 3 were completed.

Projects in hand or completed during the biennium:

Detailed geologic mapping	15
Coal	6
Oil and gas	2
Clay	1
Building stone	3
Molding sand	1
Metallic ores	5
Underground water	1
General geology	1
County reports	2
Base map and geologic map (State)	2

The Survey has received many calls from other departments of the State, including the Departments of Health, Banking, Public Instruction, and Welfare, for information, some of which has involved field trips.

Out of the ordinary was a field meeting of the Association of American State Geologists in Pennsylvania in the fall of 1925, to which the Pennsylvania Survey members acted as hosts. The State Geologist attended the International Geological Congress in Madrid, Spain, in May, 1926.

TOPOGRAPHIC WORK

During the two years, June 1, 1924 to May 31, 1926, the Survey in cooperation with the U. S. Geological Survey, has mapped topographically the following 9 quadrangles: Bradford, Brookville, Menno, Lewistown, Centre Hall, Needmore, Hawley, Mifflintown, and Blossburg, and part of the Eaglesmere, Tidioute, Townsville, Youngsville, and Titusville quadrangles—a total of 2262 square miles. It has published 5 engraved topographic sheets of about 225

square miles each, as follows: Mauch Chunk, Mount Union, Stoddardsville, Tionesta, and Towanda. In addition, photolithographs have been issued of the Berlin, Brookville, Centre Hall, Lewistown, Menno, and Hawley quadrangles.

These maps are becoming widely known and extensively used. Lack of such maps has made necessary in the past large expenditures by private corporations and individuals and the unnecessary duplication of much work. With the steady growth in the size and importance of constructional work of every character, and with good roads the demand for these maps increases. The topographic mapping of the State is at present a little more than 70 per cent completed. It is hoped some time to supply every school in the State with a topographic map of its own area, and a bulletin telling how to read and use such a map.

GEOLOGIC REPORTS AND PUBLICATIONS

The Survey has issued during the two years 7 printed bulletins as follows:

Mineral Resources of Adams County—G. W. Stose—64 pp., 11 plates, 2 in color, 1 figure, and 1 map in colors.
Soil Survey of Adams County—A. L. Patrick & H. H. Bennett—44 pp., 1 map in colors.
Coal Analyses—268 pp., 1 plate.
Limestones of Pennsylvania—B. L. Miller—350 pp., 11 plates, 7 figures, 1 map in colors.
Bituminous Coal Losses and Mining Methods—J. D. Sisler—225 pp., 1 plate, 29 figures.
Anthracite Losses and Reserves—D. C. Ashmead—71 pp., 13 plates, 1 lithograph map.
Lead and Zinc Ores of Pennsylvania—B. L. Miller—91 pp., 5 plates, 7 figures.
The following reports were in press June 1, 1926, but have since been issued:
Allentown Atlas—B. L. Miller—200 pp., 14 plates, 2 figures, 2 colored maps.
Punxsutawney Atlas—G. H. Ashley—144 pp., 1 plate, 26 figures, 5 colored maps.
Greensburg Atlas—M. E. Johnson—162 pp., 10 plates, 25 figures, 2 colored maps.
New Holland Atlas—A. I. Jonas & G. W. Stose—40 pp., 7 plates, and 2 colored maps.
Coal Fields of Pennsylvania, Part 11—J. D. Sisler—511 pp., 8 plates, 152 figures, 6 colored maps.
Slate of Northampton County—C. H. Behre, Jr.—312 pp., 36 plates, 49 figures, 2 colored maps.

These reports represent, in main, projects started and more or less completed before June 1, 1924; yet a part of the time of the

Survey members went into the final preparation, editing, and proof reading of these reports, including some field work on several of them, and of several others not yet completed.

One of the outstanding projects carried on during the two years was the preparation of a new base map of Pennsylvania following the recommendations of the Pennsylvania Board of Maps and Surveys, and a new geologic map of the State. The actual preparation of the manuscript base map was placed in the hands of skilled cartographers of the U. S. Geological Survey. The map, on the scale of 6 miles equals one inch, is now being engraved on stone. When completed it will become the property of the State, and be available for use by all departments of the State. The new geologic map, to go on the new base map when completed, will bring together on a small scale all the detailed geology published since the State geologic map was issued one-third of a century ago, and about as much more as yet unpublished detailed geology. Much of this unpublished material will be published on a larger scale within the next few years. In this work, cooperation of the members of the U. S. Geological Survey has been secured, and the Federal Survey has generously turned over to this Survey all of the unpublished work in this State in its possession.

Another important investigation undertaken and still in progress is a study of the small sizes of anthracite, the extent, location, and value of past accumulations, the rate at which additions are being made to these deposits now, their effect on the flow of streams rising in the anthracite region, and the possible recovery and use of the small sizes wasted in the past, or being wasted today. In this work, the Survey has had the cooperation of the U. S. Bureau of Mines and the Water Resources Service of this Department. Culm piles and silt banks are being sampled and analyses of the samples are being made by the U. S. Bureau of Mines.

The detailed geogic survey of the Pittsburgh quadrangle was completed and by June 1 the manuscript was nearly ready to submit. Additional work was done on the Meyersdale quadrangle, but its completion was postponed for the anthracite work. Work was continued on the Lancaster and Middletown quadrangles, and supplementary work was done on the Curwensville, Houtzdale, Punxsutawney, New Castle, McCalls Ferry, and New Cumberland quadrangles by different members of the Survey. Additional field and office work necessary to complete the Adams County report was finished, and work was begun on the Greene County report. The Bituminous Coal Reserves, computed in a preliminary way in 1922, were supplemented by additional computations and revisions.

The Survey kept in touch with the oil and gas situation, a representative making a number of trips to study new developments, especially in Clinton County. During 1925-26 microscopic and mineralogic studies were made of the deep oil and gas sands of Pennsylvania and adjoining states in the hope of finding characters by which those sands could be readily distinguished. In this work the oil and gas operators are heartily cooperating, and have been obtaining and turning over for study, cuttings of all of their present deep drillings. The porosity of the sands from cores made by some of the companies were also studied. It is believed that the results of these studies will be of very large value to the oil and gas industry.

In 1924 an intensive study of the slate of the Northampton County region was made. A report is now in press. Studies of the clays of the State, long needed, were started in 1925. The first work undertaken was on the flint clays. Samples of the flint clays of western-central Pennsylvania were collected and tested in the laboratory.

During the two years the Survey has cooperated with the American Foundrymen's Association in a study of Pennsylvania molding sands. More than 100 samples of 25 and 50 pounds each were collected. They are being tested at Cornell University at the expense of the Association. The tests of sands collected in 1923-24 were published in mimeograph bulletin No. 87. The building stones of Pennsylvania have also been studied during the last two years. Studies on the iron ore deposits of the State and on the deposits of other metallic ores have also been continued.

As opportunity has offered, the State Geologist has been preparing Part I of the Bituminous Coal Fields of Pennsylvania; a paper on the rocks and geological history of Pennsylvania, to accompany the new geological map of the State; and has written a number of short papers for presentation before clubs and societies in several cities of the State. Four of these papers were issued later as mimeograph bulletins under the titles: Age and Origin of the Earth; Salurian Stratigraphy at Lehigh Gap; A Practical Classification of Coals; and Pennsylvania, the Makings of a World Power. The State Geologist gave some attention to a "Practical Classification of Coals" proposed by him in 1919, that in modified form has since been the subject of professional study and discussion by the coal industry.

In 1925, the Survey in cooperation with the U. S. Geological Survey, undertook for the first time a definite study of the underground waters of Pennsylvania. This work was of a reconnaissance

nature. In that summer the area south and east of Blue or Kittatinny Mountain was examined. The work will be continued until the whole State has been covered.

In its general operations, the Survey has served as a clearing house for information on geologic, topographic, mining, and other related subjects. The Survey continues to receive on an average 1,000 personal calls a year from those seeking information, and from 4,000 to 6,000 inquiries a year are answered by letter. The printed reports save the Survey from writing many long letters of explanation, as was formerly necessary. The State Geologist and other members of the Survey have responded to many requests to speak on the mineral resources of the State and related subjects.

STATE PARKS, BOARDS AND COMMISSIONS

The most important relationship between this Department and the several boards and commissions affiliated with it pertains to fiscal matters. The work of these boards and commissions is now under strict budgetary control, and as a consequence it is going forward in a businesslike way. The boards affiliated with this department are THE VALLEY FORGE PARK COMMISSION, WASHINGTON CROSSING PARK COMMISSION, THE LAKE ERIE AND OHIO RIVER CANAL BOARD, THE PENNSYLVANIA STATE PARK AND HARBOR COMMISSION OF ERIE, THE STATE GEOGRAPHIC BOARD, STATE FOREST COMMISSION, AND THE WATER AND POWER RESOURCES BOARD.

THE VALLEY FORGE PARK COMMISSION

The Valley Forge Park Commission was organized at a meeting held in Philadelphia on November 3, 1923, at which time this administrative board, under the provisions of the Administrative Code (effective June 15, 1923) had become subject to the fiscal control of the Department of Forests and Waters. By reason of economies which generally affected all departments of the state government for the biennium, June 1, 1923 to May 31, 1925, the appropriation for the maintenance of the Park was only $35,000 for that two year period, an amount so small that the Commission found it extremely difficult to protect the interests committed to its care, and impossible to engage in any new developments.

In the following biennium, 1925-26, the Commission was granted $150,000 for maintenance and for the payment of interest on land purchases, pending final settlements with former owners of ground added to the Park by condemnation proceedings, and $100,000 for the improvement and repair of the roads, which had fallen into

neglect occasioning the most unfavorable remark. With motor traffic rising each year and an increase of popular interest in the nation's historical shrines, particularly in this camp ground of the Revolution, which has brought to its boundaries an ever larger number of visitors, the highway requirements were immediate. That this work might be competently executed, it was put in charge of the State Highway Department, to which the Commission acknowledges its indebtedness for the most effective service. The roads are at this time in an unexceptionable state of repair. The authorities of Montgomery County at the same time have improved the Port Kennedy road on its course through the Park, with great benefit to traffic, thus satisfactorily supplementing the work done by the State.

The appropriation for maintenance enabled the Commission to adopt a number of necessary measures. It was noted that there was seepage through the masonry at the National Arch, because of defective waterproofing of the joints. For the preservation of this monument contracts were let and the work of repair, which has been in progress for some weeks, has now been completed.

The present Commission, convinced of the need of emphasizing the historical significance of the Park, and of a treatment of the area from this standpoint, has instituted some measures which will, in their opinion, forward the end in view. Sites have been marked and explained by many new signs. The signs already in place had been introduced at a time when the Park had but a small acreage. It had come by sucessive acquisitions to comprise 1425 acres. The need was at hand, therefore, for a complete study of new requirements in this regard. Brigade positions, headquarters houses, roads, the site of Sullivan's bridge, fortifications, etc. were to be marked. At the same time a number of signs were erected giving directions to visitors as to the boundaries of the Park, county lines, and the use of automobiles. Nearly 150 of these markers, finished in conformity with those earlier in position, have been erected.

A study of the Washington Headquarters building made it clear that in a number of respects it had been spoiled by ill advised restoration. With the advice of Mr. Horace Wells Sellers, and the Committee on Historical Monuments of the Philadelphia Chapter of the American Institute of Architects, of which Mr. Sellers is chairman, changes have been made in the kitchen, the areaway between the house and the kitchen and the steps leading down from the house into this areaway. All these alterations have been in the interest of historical accuracy. Advice has been sought concerning the furnishing of the various rooms in Headquarters and changes

not already made there are in prospect. Outside of the house the hoods have been removed from the chimneys, shingles of colonial type have been substituted for tile on the roof of the pent over the entrance, and trellises for old fashioned roses, which have been planted, have been built against the south wall. The most material change in the building, which is indispensably necessary, if it is to have a colonial aspect, the removal of the modern cement pointing with which the walls were at some former time disfigured, has been authorized. The work is under contract and is in course of execution.

The small stable building, south of the Headquarters, has been rid of its entirely modern decorations and has been converted into a museum of relics. These include ammunition, bayonets, scabbards, and other war material, uncovered at diffierent times by excavation in the camp ground, household utensils, tools, coins and souvenirs of Washington, Wayne and other commanders of the Revolution who were at Valley Forge. The walls have been hung with the photographs of Washington portraits, chronologically arranged, which were presented to the Commission a number of years ago by the late Julius F. Sachse, a collection of portraits of Washington and his generals and aides presented by the late Franklin D. Stone, together with maps of the camp, pictures of the Washington Headquarters building, etc. All the pictures belonging to the Commission have been cleaned, and reframed, when this was needed, as much for their preservation as for their exhibition to the public. This museum is susceptible of extension as material comes to hand. At the same time the Camp School House as an exhibition and sales room was closed. It is open to view as the restoration of an old school room.

The changes in the Headquarters and the stable have led to the development of plans for the treatment of the entire area adjacent to these buildings. The space has been suitably lighted by electricity in front of reflectors set in the ground, which will be masked. By this device posts and globes out of the spirit of the place are avoided. The fences around the Headquarters and the gardens are to be restored. The small house with a recent mansard roof, south of the stable, used for some years as the office of the Commission, and as a residence for the Superintendent, is to be altered to appearance in keeping with its surroundings. The barn in the rear is to be made over for office and other uses. It will contain a large comfort station for the accommodation of the public. The unsightly structure now serving this use is to be removed. The great increase in the number of visitors to the Park in motor vehic-

les has made necessary the creation of parking space near the Headquarters. The continued employment for this purpose of the road in front of the building, which is often congested and therefore dangerous, is not possible. A suitable place, ample in dimensions, and easy of access from the approaching roads, exists near the barn and will be converted to this use. It is hoped by planting to effect a return of the entire area around the Headquarters to an appearance suggestive of that which it wore when Washington lived here.

With adequate parking facilities at another point in the Park in view, a larger area has been prepared and reset aside for automobiles, at the foot of the observatory on the summit of Mount Joy. New comfort stations are in course of construction at that place and at the picnic grove near Fort Huntington. Aid in this direction has come from the new pipe line, laid down across the Park in the Spring of 1926 by the Philadelphia Suburban Water Company. Their right to place their line in the Gulph Road, a public highway, was clear. Rather than submit to the destruction of the new surface of this road the Commission gave its consent, under conditions and restrictions, to the excavation of a trench by the most direct route from a point at the entrance of the Park east of the Phoenixville road to a point on the south boundary, beyond the National Arch on the way to Bryn Mawr, the objective of the line. In return for this privilege we demanded compensation which was abated by branch service lines to the house on the Huntington Headquarters site and to Mount Joy. These lines, in addition to other uses, will be of possible value in the extinguishment of forest fires. Telephones have been installed, reaching a number of key positions in the Park, so that early information may be given of fires, and for the protection of visitors, especially motor tourists, in case of accident requiring immediate relief.

The planting of the Park has been well begun at and around the National Arch. The plans for this work called for the use of a variety of trees and shrubbery. In a comparatively short time it is believed that the nakedness of the knoll on which this monument stands will be lost in verdure. In this connection, in pursuit of an arrangement of walks and vistas agreeable to the eye, permission was asked by you of the Governor of Massachusetts to remove the memorial erected here by that State to a more appropriate adjacent position. Consent was obtained and the Commission will, therefore, reset this monument in conformity with the general plans of its landscape architect. Planting at other points, as around the Wayne statue, will proceed as seasonal and other conditions favor it. Persuaded that there is need of a comprehensive policy for the arrangement of all new features within the Park, the readjustments of existing features that are incongruous and the preservation of all desirable possessions with a view to restoring the ground as a natural rural area to somewhat the same form and condition in which it was when it was occupied as a camp, the Commission has caused such comprehensive plans to be drawn up for its own guidance and as a suggestion to future commissions in these respects.

A succinct statement of the historical significance of Valley Forge, together with a map of the Park, indicating the roads and the principal places of interest, has been isssued and is distributed free by the guards. It has met with the appreciation of visitors.

The acquisition of condemned land, for which juries of view earlier made awards, has gone forward slowly. Interest and other settlements are proceeding. When the site of the old Baptist Road to the old Fatland Ford on the Schuylkill becomes available to the Commission, through settlement with the owner of the property, it is proposed that the path of this road, over which the Revolutionary commands which were stationed here constantly passed, shall be cleared of undergrowth. This will open to the visitor on foot or on horse a way to the ruins of an old picket hut which is one of the valued relics of the Revolution. Nothing of more historical value in the Park remains undeveloped, and its addition to the number of scenes of interest to the public is certain to meet with appreciation.

A number of useless buildings without historical significance acquired upon settlement of land claims need to be razed, while others, which are not obstructions and promise to be serviceable to the Commission in the work of administration, require more or less extensive repairs. Two old houses north of Valley Creek in Chester County and west of the Phoenixville road have been remodelled and restored in the Colonial spirit.

It is of interest to note the number of persons who visit the Park. Even in winter time, when it is seen to the least advantage, it is the objective of many people. In December, 1913, there were only 54 visitors at Washington's Headquarters. In 1924 and 1925 there were never less than 2500 visitors during a winter month.

In the calendar year 1925 our guards counted approximately 225,000 visitors at Headquarters, with a very much larger number in the Park. In the summer of 1926 the Headquarters were entered on a Sunday by 4500 persons. Five times this number of persons came to the Park, since many do not attempt to enter the building, because of the crowds surrounding the doors, or prefer simply to

drive over the roads to look at the entrenchments and survey the external scene.

The trust funds in the hands of the Commission are three in number:

1. That of the Centennial and Memorial Association of Valley Forge ($15,000) which is available "to purchase, improve and preserve the lands, and improvements thereon, occupied by General Washington at Valley Forge, and maintain them as a memorial for all time to come."

2. The bequest under the will of Selden Twitchell, deceased, ($10,000) "for the care and maintenance of Valley Forge Camp ground."

3. The bequest under the same will ($2500) "for the care and maintenance of Washington's Headquarters."

The Commission regrets to record the death of two of its members—George Burnham, Jr. in 1923 and Colonel George J. Elliott in 1925.

WASHINGTON CROSSING PARK COMMISSION

This Commission, authorized by Act approved July 25, 1917, P. L. 1209, as amended by Acts of 1921 and 1923, is composed of ten (10) citizens of the State appointed by the Governor, for the term of five years. All vacancies in the Commission shall be filled by the Governor. The Commissioners are authorized to appoint as Secretary one of their members who shall receive no compensation for his service. The members of the Commission are: Hon. Harman Yerkes, Hon. W. Clayton Hackett, Hon. Clarence J. Buckman, C. C. A. Baldi, Samuel C. Eastburn, Allen W. Hagenbach, Carrol R. Williams, H. Edgar Lewis, Louis H. Hitchler and Col. Henry D. Paxson. Hon. Harman Yerkes is president, Hon. W. Clayton Hackett, Secretary, and Ernest H. Harvey, Assistant Secretary and Superintendent.

The Commission is authorized to acquire, by purchase or condemnation, and perpetuate and preserve the site, not to exceed five hundred acres, on which the Continental Army, under the command of General George Washington, was assembled and from which they crossed the river Delaware on the night preceding the Battle of Trenton, December twenty-five one thousand seven hundred and seventy-six. The location and boundries of the Park shall be fixed by the Commissioners, and the Park shall be laid out, preserved and maintained forever as a public place or park, by the name of Washington Crossing Park, and shall be preserved in its original condition as nearly as possible for the enjoyment of the people of the State.

After the title has passed to the Commonwealth, the Governor, acting as Commander-in-Chief, may direct said Commissioners to open the grounds and park for the accommodation of the National Guard or any portion thereof. The Commission is authorized to make all necessary arrangements for such military camps, to provide for sufficient water supply and drainage, and during such camps to relinquish to the commanding officer, for the time being, all police control over and through the park and grounds.

The Commission owns 81.514 acres at Washington Crossing comprising the "Valley of Concentration" where the Continental Army was formed and drilled previous to crossing the River Delaware; the "Place of Embarkation" of the Army when it crossed the Delaware the night previous to the Battle of Trenton; the Old Ferry House and Hotel built in 1757 and remodelled by the Commission to be used as an Inn; and the Island in the Delaware River behind which the Durham Boats were secreted previous to crossing the River carrying General Washington and the Continental Soldiers.

The Continental Army's main camping ground at Neely's Mills and at Bowman's Hill have been purchased or condemned by the Commission and contains about 241 acres. This includes the land upon which there are many Continental Soldiers' graves, the Old Thompson House where the important councils of war were held, Neely's Mill where the grain was ground for the Continental Army, and Bowman's Hill, Washington's observation point from Trenton north.

Improvements to the land and buildings have been made as fast as appropriations would permit and those improvements that have been made are of a permanent nature and such as are a credit to the Commonwealth.

A stone wall has been built along part of the river front to prevent the terrace from washing; considerable more of the ground has been graded and seeded and several hundred additional feet of walks laid; 3400 pieces of trees and shrubbery have been added to the grounds and the standing trees and shrubbery properly cared for. A pontoon bridge to the island has been constructed and the island cleared of underbrush and the trees trimmed, thus making additional space for the visitors to use. Four rustic summer houses have been built over the various pumps supplying the Park with drinking water. Two out-door toilets have been erected and a machine house, thirty by one hundred feet, built to house the tools,

machinery, benches, tables, and other properties of the Park. On account of the heavy travel a suspension light to regulate the traffic has been placed at the intersection of the Delaware River Road and the Memorial Boulevard. Running water has been placed in all the rooms at the Inn and the porch enclosed and heated.

The Joint Bridge Commission has let a contract to build a sidewalk on the bridge from Washington Crossing, Pa., to Washington Crossing, N. J., which will be completed this season. This will serve the convenience and safety of the persons using the bridge.

The State Highway along the river bank, which leads from Morrisville to the Easton Highway at Kintnersville and passes through the Park, has been further improved by the State Highway Department. The Park is thus easily accessible from all points except directly from Philadelphia; Philadelphians have a State Highway to within three and one-half miles of the Park, the balance is dirt road and not in good condition.

During the past two summers thousands of people, from nearly all states in the Union, have visited and enjoyed this historic spot.

THE LAKE ERIE AND OHIO RIVER CANAL BOARD

During the past two years, since June 1, 1924, the Canal Board has continued its activities toward bringing about successful accomplishment of this much needed improvement. In addition to this, considerable work has been required in co-operating with the engineers of the Federal Government in protection against encroachment on and interference with the proposed waterway line and its water supply plans.

Mr. Burd S. Patterson, executive clerk who had for many years been prominently and effectively active in promotion of the canal project died June 19, 1924. Mr. Patterson was a man of high ideals and his loss was felt accordingly. Mr. George M. Lehman, who upon several occasions held the position of Chief Engineer, of the canal, being familiar with the project, took the position upon request, left vacant by Mr. Patterson.

The work of the Board suffered materially on account of the lack of funds, the appropriation made to the Board being temporarily held up. It was not possible to properly keep up expenses and make payments of existing debts until after May, 1925. A considerable amount was due the estate of Mr. Patterson, he, not having received his salary for about a year.

The Board had been long awaiting the report of Col. C. W. Kutz, U. S. Engineer Corp, who had charge of the examination of the canal routes through Ohio and of our route in Pennsylvania and northeastern Ohio. It was finally announced that the report had been received by the Chief of Engineers, in Washington, under date of March 19, 1925. Immediately the Board took action toward having the report reviewed and after correspondence with Washington, permission was given; the report, together with various papers and maps, pertaining thereto, being available in Cincinnati, Ohio.

The Board realized the desirability of having, nearly as possible, an unbiased review of the report, by an outside Engineer, and finally engaged the services of Mr. Robert Isham Randolph of Chicago, Ill. In examination of the report Mr. Lehman was instructed to collaborate with Mr. Randolph and they met in Cincinnati, Ohio.

While Col. C. W. Kutz selected our route as of greatest importance, calling it No. 1, he stated that it was "economically inadvisable" and seemed to feel that if built the railroads might then reduce their rates to those of the canal. He granted that from an engineering point of view it is entirely feasible.

Mr. Randolph set up an argument against the adversed contention of Col. C. W. Kutz, based upon fresh analyzation of the business side of the question and supported by many of the prominent independent steel concerns, which was presented at a hearing by the Army Engineers, held in Youngstown, Ohio, Nov. 7, 1925. The Board stands upon this and after careful consideration feels that Col. C. W. Kutz is wrong—that this canal link connecting the Great Lakes with the head of the Ohio River, is absolutely required to cope with present conditions and future needs, not only of this region but of a considerable portion of the United States. The favorable interest of the independent steel concerns came out strongly as never before at the above hearing.

The United States War Department in a notice issued September 3, 1925, stated that it was considering the advisability of abandoning the project for improvement of the Youghiogheny River. Inasmuch as this now is a direct arm of the largest tonnage producing stream in this country, the Monongahela River, the Board took strong exception to this suggested abandonment and addressed a communication on the subject to the local Army Officer, to the effect that the river should be improved for a distance of twenty miles, above the mouth as had been intended, and to do otherwise would throttle facilities for harbor expansion during the years to come.

According to the best information available at this moment, no action has been taken by Congress, and the project is where it was before, recommended but no funds.

Mr. Lehman having received an engagement in California relinquished his position as executive clerk on December 1, 1925, and Mr. E. L. Schmidt, C. E., who upon several occasions had been connected with the canal surveys and estimates was elected to take his place. Familiarity with the canal work has of course enabled Mr. Schmidt to be of effective service to the Board.

Mr. W. H. Stevenson, Chairman, met Mr. Robert Isham Randolph in Washington in May of the present year to examine the rebuttal of Col. C. W. Kutz on Mr. Randalph's report of November 7, 1925.

General Jadwin, Chief of Army Engineers, at the earnest solicitation of Mr. Stevenson and Mr. Randolph agreed to permit the Canal Board to reply to the rebuttal of Col. C. W. Kutz and to give the Board a hearing before the Army Engineers in September or October of the present year, before completing their report on the Canal Project, which is to be presented to Congress at its next session.

The Jones & Laughlin Steel Company of Pittsburgh and the Bituminous Coal Operators of Western Pennsylvania, have, at the present time, a protest before the Interstate Commerce Commission, against the discriminatory rail rates for raw and finished material in and out of the Pittsburgh District, in which they state that if these rates are not made nondiscriminatory, the business which has long belonged to Western Pennsylvania will undoubtedly move to the Gary, Ind., and St. Louis, Mo., Districts.

The Board therefore feels that this great question is vital to the State of Pennsylvania and that the transportation of raw and finished material at low cost can only be secured for Western Pennsylvania, by the construction of this canal.

PENNSYLVANIA STATE PARK AND HARBOR COMMISSION OF ERIE

(From Organization of Commission, December 28, 1921, to June 1, 1925.)

The first meeting of the Commission was held on December 28, 1921, at which officers were elected. The matters of most importance accomplished during the first years of the Commission's activities are as follows:

Obtaining title from the Federal Government for Presque Isle Peninsula.

Obtaining right of way through private property for the approach road.

Successfully carrying out a campaign by which $75,000 was raised by the citizens of Erie to match the $50,000 appropriated by the State.

A general survey and plan of the Peninsula, including an aeroplane survey, was undertaken by Mr. Haldeman, from the Internal Department.

The right of way was cleared of timber and 1,000 feet each of two types of experimental road were laid on the beach sand.

Two small docks, and recreation centers were built on the eastern end of the property to accommodate the public until such time as access could be had by proposed road.

A sand dredge was built and considerable filling done in anticipation of road building.

Obstructions in the way of a roller coaster and foot-bridge on the approach road were ironed out and satisfactorily settled.

In February, 1924, agreement was reached with the Erie County Commissioners, Water Commissioners of the City of Erie and the State Highway Department, under which the Highway Department was to build the half mile of approach road and the County Commissioners to expend an equal amount in the construction of road on the Peninsula, all roads built in the future to be of standard concrete type and built under the supervision and inspection of the Highway Department.

Contract was let to the Chas. H. Fry Construction Company of Erie by all parties concerned, and provided for the building of the road through the Water Works property, a distance of approximately four miles.

(From June 1, 1925 to June 1, 1926.)

The road, for a distance of approximately four miles, was formally opened in August, 1925. Parking spaces provided were found to be inadequate and steps were at once taken to widen the slag berms to 8 feet in order to accommodate paralled parking. The road immediately became very popular, and the traffic includes a large number of cars from other states. During the summer months the beach is crowded with bathers and picnickers. Some sixty tables and a number of stoves and trash baskets have been installed for the benefit of picnic parties.

A serious fire on the eastern end of the Peninsula brought to the attention of the Commission the necessity of building fire stops and providing means for combating forest fires. About two miles of fire stops and approximately seven miles of bridle path and trails were opened up and an area cleared of underbrush and fallen timber to help eliminate fire hazards. Two Evinrude pumps and 2,000 feet of hose were purchased as fire-fighting apparatus.

The Commission decided to expend all available money in the extension of the road through the Flashlight property, an additional distance of one and one-half miles, and to cut down all overhead expense in the way of superintendent and office force. This decision, it is belived has served the public demand although very few accommodations or recreational features could be provided due to lack of funds.

The filling of swamps and low lying ponds has progressed steadily, with the aid of the sand dredge, at an estimated cost of from six to ten cents per cublic yard. This will eventually help in the elimination of the mosquito nuisance. These filled-in ponds have been covered with a light coat of soil and clay and have been turned into ball grounds and tennis courts.

The Perry Memorial Commission applied for a site upon which to erect a monument to the memory of Oliver Hazard Perry. This monument has been erected on Crystal Point and overlooks Misery Bay, in which the fleet was sunk after the battle. Unfortunately, the only means to access to this property at present is by boat.

A great demand being felt and numerous applications for concessions in the way of refreshment stands being received, and there being no funds available, four members of the Commission volunteered to erect and operate a refreshment stand, with the proviso that it may be purchased by the Commission at any time, and that all profits accruing shall revert to the Commission.

The rather stringent traffic rules adopted have produced gratifying results in the elimination of practically all accidents, notwithstanding the heavy traffic that this road has carried.

The prohibition of hunting on the Peninsula has resulted in the stopping over during spring and fall migration of large numbers of ducks and geese and a flock of a hundred white swans. It is hoped to eventually make this a sanctuary for all wild life.

The Commissioners of Water Works of the City of Erie have shown great co-operation and have developed their section of the

Park at a considerable outlay of money, which includes the building of bath houses, road, paths, docks and parking spaces.

The U. S. Department of Commerce has agreed to contribute $5,000 toward the building of the road through the property occupied by the Bureau of Lighthouses, known as the Flashlight Reservation.

THE PENNSYLVANIA STATE GEOGRAPHIC BOARD

The Pennsylvania State Geographic Board was provided for by Sections 426 and 1609 of the Administrative Code.

The Board consists of the Secretary of Forests and Waters, the Secretary of Highways, the President of the Pennsylvania Historical Commission, and the Chief of the Land Office Bureau in the Department of Internal Affairs.

It is the duty of the Board to pass upon and determine all unsettled questions concerning geographic names which arise in the administrative departments of the State Government; and to determine, change, and fix the names of mountains rivers, creeks, and other topographic features within the Commonwealth.

During 1923 to 1926 the following matters have come before the Board, and have been decided as follows:

GULICH Township, Clearfield County. (Not Geulich) Named for Gerhard Philip Gulich, a pioneer.

GALLAHER Township, Clinton County. (Not Gallagher nor Gallauher) Based on Court records made when the township was confirmed.

QUEENS RUN (Not Queen's Run nor Quinn's Run) On the north bank of the West Branch of the Susquehanna River, three miles northwest of Lock Haven, Clinton County. Based on old surveys and patents dating back to 1787.

CENTRE County (Not Center) Based on the spelling in the Act creating the County.

BRODHEAD Mountain, south of Cherry Springs Fire Tower in Susquehannock State Forest. Named for General Daniel Brodhead, famous in Colonial days.

ELK LICK Township, Somerset County (Not Elklick) Confirming action of the U. S. Georgraphic Board.

UWCHLAN Township, Chester County. (Not Uwchland nor Lower Uwchlan) confirming action by the U. S. Geographic Board.

GREEN Township, Clinton County (Not Greene) Named for Captain Harry Green, who spelled his name without the "e".

CATHARINE'S CROWN, Peak in Nittany Mountain, between the Milton and Williamsport quadrangles. Named in memory of Catharine Smith, who built a grist mill and a gun boring mill at the mouth of White Deer Creek, and was prominent in colonial days.

CENTRE HALL, Centre County (Not Center Hall) In accordance with common usage and the spelling of the County named.

TRCZIYULNY Mountain, Centre County. One mile north east of Bellefonte. Named in honor of Casper Karl Stegner Trcziyulny, a prominent surveyor of early days.

ANTES CREEK (Not Nippenose Creek) Named in accordance with local usage and the desire of the residents of the region. Named after Henry Antes, a prominent frontiersman.

RAUCH CREEK applied to the upper part of the old Nippenose Creek or that part which flows through Rauch's Gap and sinks under the valley south of west of Oriole, in accordance with local usage.

THE PENNSYLVANIA STATE FOREST COMMISSION

At the beginning of the present biennium, the Commission consisted of Major Robert Y. Stuart, Secretary of Forests and Waters as Chairman, Colonel Henry W. Shoemaker, of McElhattan, Hon. Edward Bailey, of Harrisburg, Mrs. John W. Lawrence, of Pittsburgh and Dr. Henry S. Drinker, of Merion. Early in January, 1925 a vacancy occurred due to the resignation of Dr. Drinker who was succeeded in January 1926 by Hon. N. P. Wheeler, of Endeavor.

As had been customary in the past, meetings of the Commission were held monthly until October 1924 when it was decided that thereafter bi-monthly meetings of the Commission would be sufficient. This was due to the fact that under the Administrative Code a number of the duties of the Commission were placed under sole jurisdiction of the Department of Forests and Waters and in the absence of an appropriation for the purchase of land it was the opinion of the Commission that one meeting every two months would be sufficient, except in case of emergency when the chairman is authorized to convene a special meeting. It has been the practice of the Commission in the past to visit points of interest upon the State Forests and inspect the work being done thereon. During the present biennium interesting meetings were held in the Rothrock District and at the State Forest School at Mont Alto.

During the biennial period the following three proposals for the exchange of land were presented to the Commission:

1. At the meeting on August 15, 1924 the Commission decided favorably upon the proposal of the Blooming Grove Hunting and Fishing Club to exchange 1,518 acres and 30 perches for 598 acres and 26 perches of State Forest Land. The estimated value of the privately owned land exceeded that of State land by approximately $2,750. and the Commission was satisfied that an advantage would accrue to the State by reason of this exchange. Certain reservations were made by both parties relative to existing road and telephone rights of way.

2. H. D. Hough applied to the Commission for an exchange of land in Miles Township Centre County but on February 6, 1925 this proposal was rejected by the Commission since it could see no definite advantage to the Commonwealth.

3. On April 18, 1925 the Commission decided to accept the offer of the Otzinachson Rod and Gun Club for the exchange of 20 acres of State land for 156 acres owned by the Club. The growth and location of both tracts were similar in character so that the Commonwealth gains greatly in acreage and both parties have a more satisfactory boundry line.

On September 14, 1925 the Commission authorized the purchase of the Clyde S. Miller farm in Chillisquaque Township, Northumberland County of 101 acres, 119.2 perches at $150 per acre for use in the establishment of a Forest Tree Nursery in accordance with the provisions of the Act of May 13, 1925, P. L. 643.

On January 15, 1926 the offer of the Commissioners of Clinton County for the sale of 512 acres in Leidy Township was accepted conditionally.

The Commission was informed that due to the generosity of a friend of forestry whose identity is withheld by request, the sum of $567.42 has been made available under the Act of March 26, 1925, P. L. 84 for the purchase of five designated tracts of land. This will be furthered by a contribution of the Alpine Club of Pennsylvania.

In accordance with the act of May 3, 1909, P. L. 413, the following tracts of land were offered to the Commission by the Secretary of Internal Affairs and action taken upon them as indicated:

August 15, 1924, 20 acres in Erie County rejected; 101 acres, 151 perches in Pike County accepted.

September 19, 1924, 1 acre in Westmoreland County rejected.

April 18, 1925, 2.9 acres in Cambria County rejected.

March 3, 1926, 26.4 acres in Fayette County rejected; 54.6 acres in Fayette County rejected.

In each case of rejection, such action was taken for the reason that the tract in question was deemed undesirable for forest culture or for State Forest Reservation purposes.

At the meeting on January 19, 1924, the Commission approved the cancellation of the mineral lease granted to E. F. Millard upon the payment of all the Commonwealth's claims amounting to $1,050.53.

On April 18, 1925 the Commission approved the granting of a right of way to the Potter Gas Company for a pipe line for a ten year period subject to renewal privileges, the right of way to be 27,819 feet in length and 8 feet wide. In accordance with the provisions of the lease, the Company was to pay the damages as estimated by the Department of Forests and Waters, $25.00 as an annual rental, while gas is to be furnished to State houses within a reasonable distance of the gas line at current rates.

On October 14, 1924 the Commission examined a tract of eight acres in Clay Township, Huntingdon County upon which is located the largest known swamp white oak in Pennsylvania. A group of local citizens had offered to purchase this tract and donate it to the Commonwealth with the provision that it be maintained by the Department of Forests and Waters as a State Forest Park or Public Camp Area. The Commission, however, felt compelled to decline this generous offer since it believed that projects of this size and relative location to State Forest land can best be developed by local communities as a matter of local pride and responsibility.

On December 19, 1924, the Commission decided that the William H. Ludwig medal offered by W. D. Ludwig, P. S. F S. 1910, be awarded to that member of the graduating class of the State Forest School who shall (a) obtain a position in the upper third of his class and receive a scholastic average of 85 or over for the entire course and (b) be adjudged by vote of the faculty to be the most proficient in applied forestry.

On September 14, 1925, the Commission revised the policy for the distribution of free trees in order to meet certain reasonable objections advanced by commercial nurserymen relative to the distribution by the Department of Christmas trees and seedlings for ornamental use.

On February 6, 1925 a resolution was adopted by the Commission fixing a policy that the Department of Forests and Waters in granting leases for various privileges upon the State Forests should do business only with Pennsylvania concerns.

THE WATER AND POWER RESOURCES BOARD

The "Administrative Code" re-organized the Water Supply Commission under the name of the Water and Power Resources Board and made it a departmental administrative body in the Department of Forests and Waters. The powers and duties of the Water Supply Commission were divided by Sections 1604 and 1608 of the Code between the Department of Forests and Waters (Water Resources Service) and the Water and Power Resources Board.

The Water and Power Resources Board consists of five members, four of whom are the Secretary of Forests and Waters (Chairman), the Secretary of Health, the Commissioner of Fisheries, and the Chairman of the Public Service Commission; the fifth member is an engineer appointed by the Governor. The duties of the Board consist generally in acting upon applications for the incorporation of water and water power companies, merger agreements, or sale of property and franchises of such companies, applications for new or additional sources of supply of water or water power, applications for extension of time fixed by law for the beginning or completion of the construction of the works of water or water power companies and inquiry into the standing of water or water power charters, applications for dams, fills, walls, or other water obstructions or to change the course, current or cross section of any stream or body of water, applications for the condemnation or appropriation of waters and for limited water supply or limited water power permits. The Board also, upon request of the Secretary of Forests and Waters, holds hearings and decides any other matters or things, relating to waters, within the jurisdiction of the Department, Regular meetings of the Board are held on the second and fourth Wednesdays of each month.

Water Power

The Act of June 14, 1923 provides for the issuance by the Water and Power Resources Board of limited permits for dams and changes in streams to develop water power and for storing, cooling, diverting and using water for steam raising and steam condensation in the generation of electric energy for use in public service. Power projects developed under this Act have been classified by the Board as major or minor, depending upon whether the power capacity is more or less than one hundred horse-power.

Comparatively few applications for limited power permits have been received during the three years since this Act has been in effect. The major projects for which permits were issued are the Wallenpaupack development of the Pennsylvania Power and Light

Company on Wallenpaupack Creek in Pike and Wayne Counties and that of the Philadelphia Electric Company at Conowingo, Maryland, where a dam will be built in the Susquehanna River which will back water into Pennsylvania. Two applications have been received from the Clarion River Power Company in connection with its project for power development in the Clarion River, involving dams at Foxburg and Mill Creek which will create heads of 156 feet and 240 feet, respectively. Action on these applications has been withheld pending the completion of studies as to the safety of the dams, a determination of the amount of power to be developed and the effect that the operation of the reservoirs will have upon floods in the Allegheny River, particularly in the vicinity of Pittsburgh.

Twenty permits have been issued for minor power projects, one for a dam to develop steam power and one for a water supply dam which was secured so as to enable the water company to condemn the land necessary for reservoir purposes. The revenue received for the purpose of reimbursing the Commonwealth for the costs of administration of the Act has amounted in the three years to Nine Hundred Fourteen Dollars and Ninety Cents.

The Wallenpaupack Project

The Wallenpaupack Hydro-Electric Project of the Pennsylvania Power and Light Company, described in the last biennial report and built under a permit issued January 16, 1924, is practically completed and is in operation. The Board had an engineer on this project from August 1, 1924 until December 15, 1925, supervising the construction of the dam and relocated highways. Lake Wallenpaupack, the storage reservoir of the project, is the largest body of water in the State. When full it covers an area of 5,760 acres and holds 70,500,000,000 gallons of water.

When considering this project, the Board realized that the public had certain interests other than the electric power to be supplied by the company, and, when the permit was issued, a condition was attached, to which the company agreed, to the effect that holders of fishing licenses, issued under and by authority of the Board of Fish Commissioners of the Commonwealth of Pennsylvania, shall be allowed to fish in the waters impounded by reason of the construction of the dam, at all times during the open season in accordance with such rules and regulations as may be promulgated from time to time by the company, subject to the approval of the Board of Fish Commissioners. Negotiations are now in progress with a view of securing to the public access to the lake at numerous

points and the use, for recreational purposes, of a marginal strip around it.

An Act of Legislature approved June 14, 1923, a companion act to that providing for limited power and limited water supply permits, gives to public service companies holding such permits the right to condemn and appropriate such water, lands and other property and rights, and to flood, relocate and reconstruct such highways, bridges and railroads as the Board shall find necessary for the project. Under this act, the Pennsylvania Power and Light Company has filed three petitions; one for the approval of the condemnation, relocation and reconstruction of highways and bridges flooded by the new lake; one for the condemnation of right-of way for the transmission line, and the third for the condemnation of certain tracts of land along the margin of the lake, which the company has been unable to acquire by purchase. The first two petitions were approved and the third is pending.

The Act requires that the highways and bridges condemned shall be relocated and rebuilt as the Board shall require, and, in issuing orders for the reconstruction of such highways and bridges, the Board has endeavored to consider the interests of all parties concerned in such a manner that no undue burdens will be placed upon any by reason of the new construction. The new highways and bridges are considered to be equivalent to the old ones, when the increased costs of maintenance and of possible future widening on the present locations are considered. More than nine miles of new State Highway Route were built and over seven miles of township road. Two new bridges were constructed and one old bridge relocated over Wallenpaupack Creek, and a number of new bridges built over the smaller tributaries flowing into the lake.

Incorporation of Water Companies

Thirty-one applications for the incorporation of water supply companies, five mergers, three purchases of the franchises and all the property of water companies by other water companies, and one application for an additional source of supply were approved during the two-year period.

Construction and Repair of Dams

One hundred applications were received for the construction of new dams and forty-one applications for repairs or alterations to existing dams. One hundred and eighteen permits were issued; seventy-four for new dams and thirty-four for repairs or alterations to dams under the Act of June 25, 1913, and nine limited power permits and one limited water supply permit under the Act of June

14, 1923. The most important dams for which permits were issued were the Still Creek Dam of the Panther Valley Water Company and the Pickering Creek Dam of the Philadelphia Suburban Water Company. Of the permits issued for alterations, that issued to the Roaring Creek Water Company for raising its No. 6 Dam was the most important. Descriptions of these dams follow:

Still Creek Dam, Panther Valley Water Company

This dam will be built on Still Creek, about four miles north of Tamaqua, in Rush Township, Schuylkill County, and will form a reservoir a little more than two miles long and a third of a mile in maximum width, with a capacity of about 2,500,000,000 gallons. It will be used to store water for domestic and industrial supply for towns and industries in the Panther Creek Valley, in Schuylkill and Carbon Counties, including the towns of Coaldale, and Lansford. The dam will be an earth embankment, straight in plan, with a spillway channel around one end; it will be 87 feet in maximum height and 1300 feet long on the crest. The top width, at an elevation 10 feet above the normal waterline, will be 20 feet. The upstream slope will be 1 vertical on 2-½ horizontal for 40 feet in elevation below the top, below which it will be 1 vertical on 3 horizontal, protected with 18 inches of riprap. The downstream slope will be 1 vertical on 2-½ horizontal broken by a 6-foot berm of 40 feet below the top; this slope will be protected by grass.

Still Creek is one of the few undeveloped streams in the southern anthracite region, and, in issuing the permit for this dam, the Board attached the following condition:

> "The Water and Power Resources Board, after due notice and public hearing in connection with the application for this permit, finds that Still Creek is the logical source of water supply for the communities in the Valley of Panther Creek together with the Borough of Summit Hill, and in the Valley of the Little Schuylkill River from its confluence with Still Creek to a point one and one-half miles below its confluence with Panther Creek.
>
> "The permittee specifically agrees in accepting this permit, to supply, upon application and at the published rates, such of the said communities as it may lawfully supply, with water from Still Creek for domestic and municipal purposes, sufficient in amount at all times for the needs of said communities, as may be required by order of the Water and Power Resources Board, after due notice and public hearing, in so far as such supply may be available by reason of the development proposed under this permit."

Pickering Creek Dam, Philadelphia Suburban Water Company

Pickering Creek is one of the three sources of supply used by the Philadelphia Suburban Water Company, which furnishes water in the greater part of the territory immediately surrounding the City of Philadelphia. The demand for water in this territory is constantly increasing and it has been found necessary to augment the supply from Pickering Creek. The company has at the present time a low dam impounding about 15,000,000 gallons of water. The proposed dam will create a reservoir about two miles long and a thousand feet in maximum width with a capacity of 380,000,000 gallons.

The dam will be 40 feet in maximum height and about 1,000 feet in length. About 600 feet of the central portion will be of hollow reinforced concrete construction, while the ends will be gravity masonry sections. The hollow section will consist of a reinforced concrete deck with a slope of about one vertical on one horizontal, supported by buttresses 15 feet center to center. The downstream ends of the buttresses will be vertical except in the spillway section where they will have a batter of 2 feet vertical on 1 horizontal, supporting a reinforced concrete slab to carry the flood discharge from the reservoir to the stream below. This dam is now being built.

No. 6 Dam. Roaring Creek Water Company

The Roaring Creek Water Company, supplying water in Shamokin and vicinity, having need of additional water to supply this territory, has made alterations to its No. 6 Dam on Roaring Creek, about seven miles north of Shamokin.

The dam, 40 feet in maximum height, was an earth embankment with a core-wall creating a reservoir holding about 600,000,000 gallons. The dam, as rebuilt, is 59 feet in maximum height, 1,800 feet long, and the capacity of the reservoir has been increased to 1,330,000,000 gallons. The top of the dam is now 26.5 feet wide at an elevation 5 feet above the flow line. The downstream slope is 1 vertical on 2 horizontal. The upstream side of the embankment is level for 3.5 feet at an elevation 3 feet above the flow line, below which the slope is 1 vertical on 2 horizontal for 20 feet in elevation followed by a slope of 1 vertical on 2-½ horizontal to the upstream toe; the upstream slope is protected by riprap and

the downstream slope by grass. The core-wall, at the upstream edge of the crest, has been raised approximately 20 feet and projects 3 feet above the top of the embankment forming a parapet. The spillway is in excavation around the right end and is a masonry-lined channel in which a low weir determines the water level in the reservoir. The spillway opening is 80 feet long and 8 feet deep and will discharge a flood flow equivalent to a rainfall of one inch per hour, with 3 feet of free-board between the maximum height of the water and the top of the dam. Construction work on this project is completed.

It has been the consistent policy of the Water Supply Commission of Pennsylvania, and its successor the present Water and Power Reources Board, to maintain representatives constantly on the ground during the construction of all dams of the hollow reinforced concrete type, and, in accordance with this policy, a representative has been placed on the Pickering Creek project described above, and another will be placed on the dam to be built by the Borough of Mount Union across Singers Gap Run, in Huntingdon County.

Encroachments other than Dams

Six Hundred Eighty-one applications for encroachments other than dams were received during this two-year period. Four Hundred Thirty permits were issued for the construction of bridges, nine for fills, and one hundred seventy-nine for miscellaneous encroachments, a total of six hundred eighteen permits.

The co-operative arrangement between the Board and the Federal Government with respect to control and regulation of encroachments in navigable rivers has been continued in accordance with an agreement with the War Department.

Channel Lines

Property owners along the Schuylkill River in Manayunk, Philadelphia, have for years been urging that lines be established along the stream, defining the channel and fixing for all time its alignment and width. The river throughout this section of the City is lined with mills and factories and confined between railroads and the Schuylkill Canal, so that there has been little room for expansion except toward the river. In the absence of laws in past years prohibiting restriction of stream channels without State consent, mills and railroads had secured additional area for expansion by making fills and walls in the channel, with the result that it has become narrowed in many places so that there is not enough area to pass flood waters. The damage from floods has therefore

been increasing from year to year, while individual mills seek to encroach even further into the river.

During the past year the Board made a survey of the river between the Flat Rock Dam and the mouth of Wissahickon Creek, a distance of three miles, and adopted lines defining the channel beyond which no encroachments will be permitted. These lines cut into the bank at the narrow sections where the channel has been most restricted by fills and it is expected that before many years the channel may be opened up at these places and the flood carrying capacity correspondingly increased. Where the channel is wider than necessary, encroachments will be permitted, so that property owners now know exactly to what line they may build without increasing the flood hazard to the community. The lines are defined by courses and distances and will be marked on the ground by a series of ninety monuments and bronze markers.

Through cooperation with the City of York, channel lines were established along the Codorus Creek in that City, a distance of 2.2 miles. These lines were defined by ordinance of the City and approved by the Water and Power Resources Board. The survey used in defining these lines and upon which the necessary hydraulic calculations were based, was made by the Water Supply Commission several years ago.

Surveys and engineering studies are being made and plans being prepared leading to the establishment of channel lines along the Shenango River in the Cities of New Castle and Sharon and preliminary work has been started in other cities. Lines have heretofore been established along the Conemaugh and Stony Creek rivers in Johnstown, Neshannock Creek, New Castle and Dunbar Creek in the Borrough of Brownsville.

Flood Survey—Allegheny and Monongahela Rivers

In accordance with an Act approved June 14, 1923, an agreement was executed on August 6, 1925 between the Secretary of War and the Water and Power Resources Board relative to a survey of the Allegheny and Monongahela river, with a view to the control of floods therein. Under this agreement, the War Department will, with the cooperation of the Board, make examinations, investigations and surveys of said rivers and prepare plans and estimates of cost for controlling flood waters, the expense of said work to be borne in equal shares by the United States and the Commonwealth, the total expense to the Commonwealth not to exceed $25,000.00. This work was started in September, 1925, and has been progressing satisfactorily, although not completed at the time of the preparation of this report.

Pymatuning Reservoir Project

Work on the Pymatuning Reservoir Project during the past two years has consisted largely in the administration of the land acquired by the Commonwealth, the rental of said lands and sale of timber thereon, the maintenance and operation of stream gaging stations and the purchase of additional land with the accumulation of funds from rentals.

Important additional legislation with respect to the project was enacted in 1925. The Act of April 16th authorizes counties, cities, boroughs, towns and townships to appropriate and borrow money for use by the Commonwealth in the construction and completion of any project or improvement authorized by law for the conservation of water and control of floods, and provides for the expenditure and re-payment of such moneys by the Commonwealth. Section V of this Act provides that, "The Department of Forests and Waters shall have full power to use and expend the funds advanced by municipalities under the provisions of this Act on the projects and improvements designated in the same manner as any funds heretofore or hereafter appropriated by the Commonwealth, for the construction and completion of said project or improvement where authorized to be expended by law." No such moneys may be appropriated, borrowed or advanced to the Commonwealth by any such municipality, however, except for an expenditure on a project or improvement which has been, prior to the passage of the Act, authorized by law to be constructed and completed by the Commonwealth for the conservation of water and the control of floods. The Commonwealth declares in the Act its intention to repay without interest to the municipalities respectively all moneys advanced in not more than fifteen equal biennial installments commencing not later than three years after any such moneys are advanced.

The Act of May 14, 1925, repealed all previous general acts relating to the Pymatuning Reservoir Project and combined the provisions of the former acts under one law. Under the provisions of this law all of the authority vested in the Water Supply Commission of Pennsylvania, with respect to the Pymatuning Project, was transferred to the Department of Forests and Waters acting through the Water and Power Resources Board.

Several joint meetings have been held by the members of the Water and Power Resources Board and the Shenango and Beaver Valley Conservation Association, an organization having for its object the completion of the Pymatuning Project. A field examination was made by these bodies of the area to be flooded by the proposed reservoir and plans for raising the moneys necessary to complete

the project have been discussed. A conference was held by the representatives of the Board and of the Highway Departments of Pennsylvania and Ohio, relative to the road relocations and so as to satisfactorily arrange for interstate highways.

Detailed estimates of the cost of the project have been made on the basis of existing prices for May, 1925, including all items which are liable to enter into the work of building the dam and spillway, highway and railroad changes, purchase of the remaining lands, and the clearing and preparation of the basin for the reservoir. A revised report, showing the needs, results, and benefits to be derived from the completed project, have been prepared and placed in the hands of the printer for publication.

The Board is authorized under an Act passed in 1923, to lease the lands purchased for the project and to sell excess land, buildings and timber. Seven tracts of timber have been sold for a total sum of $3,350 and the sale of three unnecessary buildings has netted an additional $230. For the year ending April 1, 1925, money received from rental for seventy-two parcels of land under lease has amounted to $6,459.75. For the year ending April 1, 1926, rentals from seventy-three tracts under lease amounted to $6,421. Every property, with building improvements upon it, has been kept under lease for the past two years and many other tracts have been rented for pasturage purposes. The lands not under lease are of such a character that they are not suitable for uses other than hunting, fishing, trapping, and berry picking and have been set aside for recreational use. From the accumulation of funds derived under the Act of 1923, advantageous purchase has been made of one hundred sixty-seven acres of additional land required for the project.

Public Hearings

The Board held, during the two-year period, forty-seven public hearings in connection with applications before it, or matters referred to it by the Department of Forests and Waters.

END OF YEAR

End of Title

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